Medicon Engineering Themes
Volume 5 Issue 1 July 2023
Article Type: Research Article
ISSN: 2834-7218

Spin and Charge Collaborating in pico-particle Hydrogen of Water

Sunao Sugihara[1]*, Hiroshi Maiwa[2] and Takumi Amano[2]

[1]*Shonan Institute of Technology, Department of Human Environment, Fujisawa, Japan*

[2]*General Incorporated Association Green Earth Again; Yokohama, Japan*

***Corresponding Author:** Sunao Sugihara, Shonan Institute of Technology, Department of Human Environment, Fujisawa, Japan.

Received: June 07, 2023; **Published**: June 15, 2023

DOI: 10.55162/MCET.05.147

Abstract

We focus on essential part of water, which is the basic substance on the earth. Nobody looks at a single water molecule; and an established theory has not been how many molecules of H_2O combine to form a cluster. Most research on water starts from H_2O unexpectedly. Our essential research of water is the dissociated water of the hydrogen bonds although the hydrogen bond itself seems to be established in water. But our researh is about the presumed particle of H^+ and e^- in a hydrogen atom. It is not the atom, neither the H_2 molecule or the OH ion. The present study's central theme is to clarify the collaborating function of spin and charge, We propose the particle equation instead of wave function. Furthermore, we approach information-transfer by way of collaboration of proton and electron in the atom to form a field in any substance, even in space. In the future we will make clear the potential of the infoton which is difficult to define because it is a space function, and spins, charges, and momentum may entangle associating with information-transfer as well.

Introduction

Atomic nucleus of the hydrogen atom is the most abundant in universe and basic element constituting our daily life substance such as water and organic compounds.

H. Cavendish firstly recognized that hydrogen gas was a discrete substance [1, 2], and that it produced water when burned, the property for which it was later named: hydrogen means "water-former" in Greek. Hydrogen gas is gathering attention in view of sustainable development goals for clean energy, for a car power source, and electric power energy neither a nuclear nor coal and oil since the 21st. Besides, hydrogen gas absorption is used for human health putting aside good or bad.

However, there are so much research on the water as limiting H_2O only (not water compounds), as a unique theme, the fourth phase of water [3] and the floating water bridge as the dynamics subject under ~20kV [4, 5]. There is a report studying a quantum state like thermal infrared emission and fractal ordering in distilled coherent water [6]. Here is written about the hydrogen bond's four neighbors from the points of density, diffusivity, and structure [7]. Other research on hydrogen bonds relates to the potential energy with bond angle and distance [8], and this is also a kind of structural study with bond network rearrangements in liquid water [9].

We have researched water since the 2007s, and what we pay attention to is named the active water originally. One of author questioned what the "active water" was and recognized it to broke a cluster of water with certain pressure and noticed hydrogen bonding energy of approximately 0.3 eV [10].

We started to study the car exhausted gases to reduce CO_2 etc., [11], then we reported fresh food kept in "activated" bag with the water [12]. Our previous research related to chemical reduction with hydrogen. After that, the author paid attention the Fukushima contaminated soils by radioactive materials in 2011 and decontaminated the radioactive cesium 134 and 137 to decrease more than 90 % for three days with the "active" water [13].

The active water may be interested in the viewpoint of information transfer. The radiation is an issue of a nucleus, not chemical reduction associating with electrons outside a nucleus. Therefore, the hydrogen particle of our study plays a role in changing radioactive cesium to stable barium [14]. And it is challenging to elucidate the nucleus varies because of water, H_2O and H_2, so we notice to hydrogen particles which is Sugihara's concept.

Here, our purposes are to discuss the functions of proton and electron in a hydrogen particle in terms of momentum, which we named infoton [15], and water containing infoton SIGN water (Spin Information Gauge-field Network) [16]. Furthermore, we discuss what the information- transfer is from the viewpoint of the infoton.

Materials and Methods

We can fabricate SIGN water under high pressure to tap water more than 100 MPa [14] without any additive, which involves the pico-size particle such as infoton, and transfers to another substance as information associated with the momentum. We asked Echigo Seika Co., Ltd. (Niigata Prefecture) for a high-pressure process.

Our analysis instruments are Hydrogen- based Nuclear Magnetic Resonance (H-NMR), where we can identify two points. One is relaxation time (T2), in which the more significant the time (sec) is, more minor the water size is. Another point is Free Inductively Decay (FID), in which the smaller the time (sec) is, the smaller the water size is; we can recognize the time that water particle resonates each other.

Another instrument is Fourier Transform Infrared Spectrometer (FTIR), in which we can judge the transparency of water particles by infrared beam because terahertz wave usually absorbs. Smaller water particles can penetrate in this region.

We employ Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) for element analysis. Every method was precise in our reports [11-15].

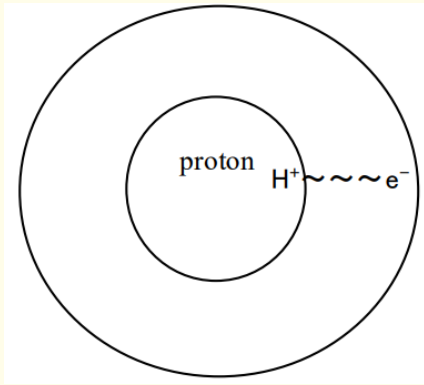
Results and Discussions

Characteristics

First, we propose a "particle equation" rather than a wave equation shown in quantum mechanics [17].

Secondly, we don't use an imaginary number (i), because physics treats natural world, leading to scientific elucidation of phenomena. However, pure theoretical physics seems apply an imagination at the present. First we introduce a familiar wave funtion from some textbooks, then focus on discussing an electron and a proton in hydrogen of water involving an imaginary number because water is an actual existence.

Namely, an electron is assumed to oscillate between proton and an elecron outside orbital. The length of the Van del Waals force is 120 pico-meters in a molecule of H_2 but, in our case, closes to 78 pico-meters in atomic hydrogen (H^+) [18]. That is why we introduce our electron oscillates at the distace of approximately 70 pico-meters in our assumed model (electron still exists inside hydrogen, not hydrogen ion).



Electron oscillation between proton and outside orbital (assumed distance is 70 pico -meters).

Figure 1: Hydrogen atom model in the viewpoint of the electron movement.

Particle equation;

Firstly, here is the most straight forward wave function given by Schrödinger;

$$i\,\hbar\frac{\partial\Psi}{\partial t} = -\hbar\frac{1}{2m}\nabla^2 \qquad (1)$$

and a relativistic equation developed by Dirac and Schrödinger [17, 19],

$$i\hbar\frac{\partial\Psi}{\partial t} = \left[-\frac{\hbar}{2m}\nabla^2 + \frac{ie\hbar}{mc}\boldsymbol{A}\cdot\boldsymbol{grad} + \frac{ie\hbar}{2mc}(\boldsymbol{div}\,\boldsymbol{A}) + \frac{e^2}{2mc^2}A^2 + e\phi + V\right] \qquad (2)$$

(a) (b) (c) (d) (e) (f)

(a) Electron kinetic energy.
(b) & (c) Interaction with other potential (two terms).
(c) Electron interaction each other.
(d) Electric field.
(e) Other potential.

They indicate the imaginary number, i, obviously. We understand to use i in the mathematical field showing the plane like, (x, z) in Fig. 3.

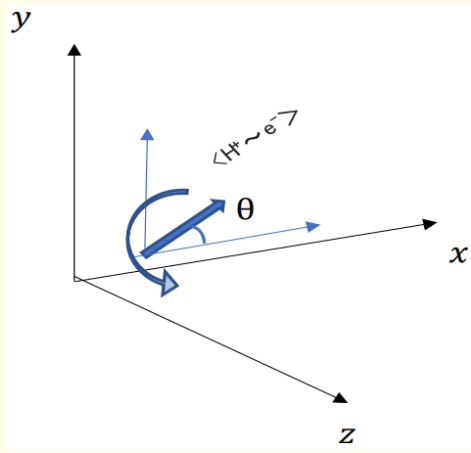


Figure 2: Three-dimensional space playing in physics and mathematics.

We introduce the number of $\pm\frac{1}{2}$ instead of i and the function is same as i.

Besides, we do not necessarily regard the $(x.\ y)$ plane as an imaginary field when physics apply the space shown in Fig. 3.

And Bohr proposed a simple rule; angular momentum* of the orbital is supposed to be integral multiple of $\boldsymbol{h}/2\pi$ (= $\hbar$).*); we introduce it later.

We neglect the term (d) in equation (2) because there is just one electron in our case, <H^+~ e^->. There are two terms, (e) and (f), relating to the next equation (3). The particle equation we define shows as follow,

$$(\pm\frac{1}{2})\{\frac{\hbar}{2\mu}\frac{\mathbf{d}^2}{\mathbf{dr^2}}+\frac{\hbar\,\boldsymbol{\ell}\,(\boldsymbol{\ell}+1)}{2\mu r^2}\}\,u_\ell\,(\mathrm{r})=\frac{\hbar}{2\mu}\hbar^2\,u_\ell\,(\mathrm{r}) \qquad (3)$$

Where, ℓ indicates angular momentum and μ is reduced mass of proton and electron; 1.6738×10^{-27} kg calculated from total mass of electron and proton each other.

Relation of the particle to the field

The particle <H^+~ e^-> makes and moves, forming "field" concerning the coordinate space in Fig. 2 and (x, z) plane as well.

The usual Schrödinger wave function describes as following;

(1) Y (θ, φ) is spherical harmonics, and we can solve it with a usual process which the potential V_ℓ (r) is a function of distance and given by the following equation; m, ℓ; quantum number, (m; magnetic momentum, L: orbital angular momentum);

$$\{-1/2\,\nabla^2+V_\ell(r)\}\,\chi(r)=E\,\chi\,(r)\ \text{to}\ \chi\,(r)=\mathrm{R}\,(\mathrm{r})\,\mathrm{Y}\,(\theta,\varphi), \qquad (4)$$

The potential $V_\ell\,(r)$ is a function of the distance, which the infoton possesses.

Furthermore, the potential is difficult to define because it is a space function, and spins, charges, and momentum may entangle. We reported the stability in energy and potential previously [20], discussing the potential changes and stability between <H^+ ~ e^->, <H^+ ~~ e^->, <H^+ ~~~ e^->.

Here, we focus on spins and charge and discussing microscopic mechanism of the oscillation at the distance of 70 picometers in Fig.3. The figure shows + charge and +1/2 spin in proton. In the <$H^+ \sim e^-$> situation, charge is e^- and spin is -1/2, then the particle changes to ±1/2 moving toward the middle status, <$H^+ \sim\sim e^-$>. We are not sure what causes may relate to decide +1/2 or -1/2 at this moment.

Finally, electron charge decreases minus which means positive area may increase according to Dirac's theory [17]. Then repulsion force works between proton and positive charge with +1/2 spin. Then, electron moves back around 70 picometers.

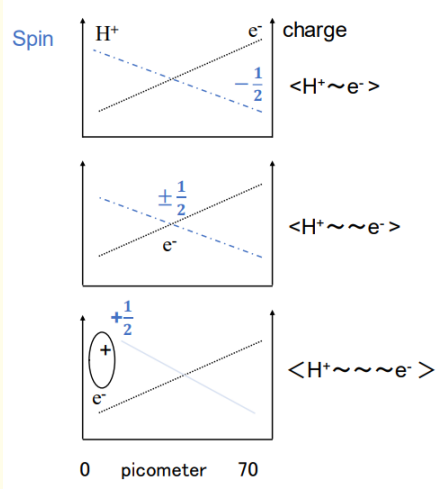


Figure 3: The model in changing spin and electron charge moving between proton and the outer electron orbit. The charge and spin of proton are fixed, + and +1/2, respectively.

The particle movement forms the field

The particle forms the field along with movement, and the area becomes the cause of the particle transfer. In other word, this phenomenon may elucidate the transfer of information. Now we want to define what the content is in physics. For instance, it may be a quantum shown in following;

This phenomenon relates to emission of far infrared through terahertz based on our measurement of dielectric constants (ε) using the following equation;

Plasma frequency, $\omega_p^2 \approx 4\pi e^2/(m* \varepsilon)$, where m* means an effective mass of electron and ε is the dielectric constant, then we found 1~2 THz electromagnetic wave [11]. We consider that the oscillation of the infoton is a plasma frequency.

The particle, <$H^+ \sim e^-$>, may transfer by way of THz to Far-IR in the field. This evidence can find from the quantum equation described below,

Information- transfer by the particles

Information-transfer by the particle is the most challenging theme of our particle, namely, the infoton' s transfer mechanism and what the information is. The transfer's mechanism may be movement of spin and charge, which we discussed in Fig.3. and the emission of far IR through THz electromagnetic waves. And the information relates to momentum shown in equatoin (3). The momentum indicates in kg ▪ m/s. and canonical momentun, described in a generalized coodinates (q_i) defined in analytical mathematics.

And the generalized momentum (p_i) associating with (q_i) is described in the following equation (5).

$$p_i := \frac{\partial L(\boldsymbol{q}, \dot{\boldsymbol{q}})}{\partial \dot{q}_i} \qquad (5)$$

Where Lagrangian $\boldsymbol{L}\ (\boldsymbol{q}, \dot{\boldsymbol{q}})$ is in analytical mechanics, but this momentum is driven by symmetry. Our system is somewhat angular momentum shown in equation (6);

$$\boldsymbol{L} \equiv \boldsymbol{r} \times \boldsymbol{p} \qquad (6)$$

$$L = rp \sin\theta$$

Therefore, angular momentum $\boldsymbol{L}$ in equation (7).

$$\boldsymbol{L} = \boldsymbol{r} \times m\boldsymbol{v} = m\boldsymbol{r} \times \boldsymbol{v} \qquad (\because \boldsymbol{p} = m\boldsymbol{v}) \qquad (7)$$

Namely, angular momentum $\boldsymbol{L}$ around a point mass indicates the number at the position $\boldsymbol{r}$ in equation (7). We can regard the system shown in Fig. 2. Thus, the direction of information will also be necessary, even in our daily communication.

Gauge field playing for information-transfer

The infoton itself forms the field as discussed above; it is a gauge field that is cannonical, namely, no matter where the corordinate is. The reason is that infoton emits far-IR through THz.

The Hamitonian of the following equation describes the electromagnetic waves; The second term in the first single integration relates to the transverse wave (far- IR) involving a curl A, and the double integration means the longitudinal wave (THz) associating with Coulomb force. A transverse wave usually defines as that; a wave that vibrates vertically in proceeding with direction; we can recognize it as a sine curbe (or sinusoid) like an electromagnetic wave. Meanwhile, longitudinal wave vibrates in the same direction of movement as an acoustic wave.

The expression of (curl A) in mathematics means a rotation, so we can realize it is transverse wave.

$$H = \int \psi^* \left[\ \omega\left(\pm\tfrac{1}{2}\hbar\right) c\ \mathrm{grad} + \mathrm{e}\ \mathrm{A}\ \right]\psi$$

$$+ \int \left[\ 2\ \pi\ c^2\ \ \tfrac{2}{e} + \frac{1}{\pi}\ (\mathrm{curl\ A})^2\right] \mathrm{d}\tau + \frac{1}{2} \iint \frac{\rho\ (r,\ t)\ \ \rho\ (r',\ t')}{|r - r'|}\ d\tau\ d\tau' \qquad (8)$$

Where ω-term (spin) and eA (potential) of electron in the first term, respectively.

P_e; momentum, A; electromagnetic potential, ρ; electric charge, r-r'; a distance between nucleus and electron in the infoton; $<H^+ \sim e^->$, $<H^+ \sim\sim e^->$, $<H^+ \sim\sim\sim e^->$. We call this particle equation rather than a wave equation like (2). We must develop the last term of Coulomb force as the potential in the future.

Conclusion

We approached the basis of water. Notably, we do not study H_2O itself, but the idea is the dissociated water of the hydrogen bonds in which we focus on the presumed particle of H^+ and e^-. This particle is not a hydrogen atom, a H_2 molecule, or OH ion. The central theme of the present study is to clarify the collaborating function of spin and charge in the particle. And we propose a particule equation instead of usual wave equation, although we must develop the potential in the last- term equation in the near future. Furthermore, we discussed SIGN water containing the infoton. And we approach essential characteristics of proton and electron for information -transfer to form a field in any substance, even in space. In the future we will make clear the potential of the infoton which is difficult to define because it is a space function, and spins, charges, and momentum may entangle associating with information-transfer as well.

References

1. "Hydrogen". Encyclopedia Britannica (2021).
2. Jim Al-Khalili. "Discovering the Elements". Chemistry: A Volatile History. 25:40 minutes in. BBC. BBC Four (2010).
3. Pollack GH. "The Forth Phase of Water". Ebner & Sons Publishers, Seattle WA, USA (2013).
4. Fuchs EC., et al. "The floating water bridge". J. Phys. D: Appl. Phys 40 (2007): 6112-6114.
5. Fuchs EC., et al. "Dynamics of the floating water bridge". J. Phys. D: Appl. Phys 40 (2008): 1-5.
6. Johansson B and Sukhotskaya S. "Allometric Scaling Behaviour–A Quantum Dissipative State Implies a Reduction in Thermal Infrared Emission and Fractal Ordering in Distilled Coherent Water". Water 3 (2012): 100-121.
7. Sastry S. "Order and Oddities". Nature 409 (2001): 300-301.
8. Scott JN and Vanderkooi JM. "A New Hydrogen Bond Angle/Distance Potential Energy Surface of the Quantum Water Dimmer". Water 2 (2010): 14-28.
9. Smith JD., et al. "Energetics of Hydrogen Bond Network Rearrangements in Liquid Water". Science 306 (2004): 851-853.
10. Pauling L. "The Nature of Chemical Bond". 3rd ed, George Banta Company Inc (1960).
11. Sugihara S and Hatanaka K. "Photochemical Removal of Pollutants from Air or Automobile Exhaust by Minimal Catalyst Water". Water 1 (2009): 92-99.
12. Sugihara Sunao., et al. "The Mechanisms of Activation of Substances by Minimal Catalyst Water and Application in Keeping Foods Fresh". Water 3 (2011): 87-94.
13. Sugihara S. "Deactivation of Radiation from Radioactive Materials Contaminated in a Nuclear Power Plant Accident". Water 5 (2013): 69-85.
14. Sugihara S. "Model for Transmutation of Elements using Weak Energy of Water Leading to Faster Disintegration of Radionuclides". WATER 10 (2018): 82-98.
15. Sugihara S. Infoton: Certificate of trademark registration No. 5138668, Japan Patent Office (2008).
16. Sugihara Sunao. "Faster disintegration of radioactive substances using energy of specially-processed water and theoretical prediction of a half-life of radionuclide". International Journal of Current Research and Academic Review 3 (2015): 196-207.
17. Dirac PAM. "The Principles of Quantum Mechamics". fourth edition, Oxford at Clarendon Press (1930).
18. Emsley J. The Elements, the 3rd edition, Clarendon Press, Oxford (1998).
19. Schiff LI. Quantum Mechanics, second edition, The McGraw-Hill Book Company, London (1955).
20. Sugihara S and Maiwa H. "The Behavior of Water in Basic Sciences and its Applications after Hydrogen Bond Dissociation". Medicon Agriculture & Environmental Sciences 2.4 (2022): 03-10.

Volume 5 Issue 1 July 2023